To the Officers and Members
OF THE

APA TECH

PIANO 2 HANDS 50.
PIANO 4 HANDS 1.00
PIANO 6 HANDS 1.50
ORCHESTRA 1.00
MILITARY BAND 50.
ZITHER SOLO 50.

ZITHER DUET 90.
MANDOLIN SOLO 40.
MANDOLIN & PIANO 60.
MANDOLIN & GUITAR 50.
MANDOLIN-PIANO & GUITAR 80.
2 MANDOLINS & PIANO 80.

2 MANDOLINS & GUITAR, 70.
GUITAR SOLO 40.
GUITAR DUET 50.
BANJO SOLO 40.
BANJO DUET 50.
BANJO & PIANO 60.

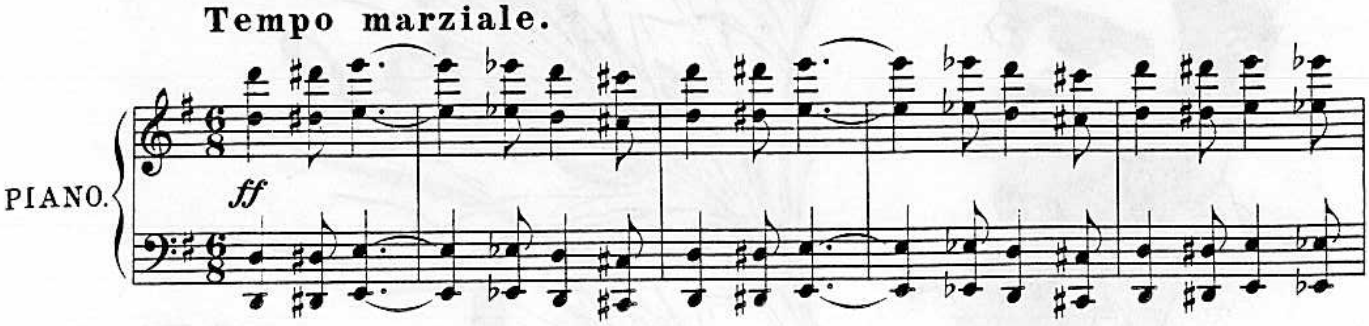
PUBLISHED BY
THE JOHN CRUNCH COMPANY.

SAN DIEGO NEW YORK. CHICAGO. LEIPSIC.

I SUPPOSE YOU'D RATHER I BE JOHN PHILIP SOUSA?

Gregory Ruffa
10380 Maya Linda Rd., Apt. C-303
San Diego, Calif. 92126
(619)-695-8647

("Reality is the leading cause of stress
for those in touch with it.")



Not much has happened since I wrote my last bit, at least not much that's been good. The trial I was involved with ended just before lunchtime on the 26th; I had to be around for the whole thing, even though alternate jurors don't participate in deliberations. That meant spending ten hours in the jurors' lounge: at least I got caught up on some reading. I am satisfied that justice was done. The prosecutor had the ungratifying task of arguing a case where two of her own key witnesses contradicted each other; it was nearly impossible to make a convincing case of the defendant's guilt and quite easy to believe he acted in self-defense. When I returned to work, I had to tell the story about eight times. Rather than do that again here, I enclose the boiled-down account from the San Diego Tribune of 27 March. If you really want to know more, ask me at a convention or something...

Jury acquits Navy man

A jury has acquitted a Navy man charged with attempting to murder two sheriff's deputies who were trying to take away his water pistol.

The defendant, Petty Officer 2nd Class David Tollerson, 34, of Santee, was found innocent of all charges by a Superior Court jury that deliberated 2½ days.

Tollerson had been charged with attempting to murder and assaulting Sheriff's Deputy Michael Moreno and Sgt. Gordon Brooke with Moreno's revolver on Sept. 13 outside Brannen's Bar in Santee.

Moreno, Brooke and two other sheriff's vice officers were trying to take away Tollerson's water pistol, which they had mistaken for an Uzi automatic weapon.

Tollerson testified that he did not hear the officers identify themselves as "sheriff's vice" and Brooke had testified that their clothing made them look like "Santee cowboys." Tollerson said that during a struggle he tried to push away a revolver Moreno was holding at his face.

During the struggle, Brooke shot Tollerson in the abdomen. He was flown to UCSD Medical Center and has recovered.

Tollerson's attorney, Nelson Brav, said his client has filed a $250,000 claim against the county alleging that the deputies used excessive force.

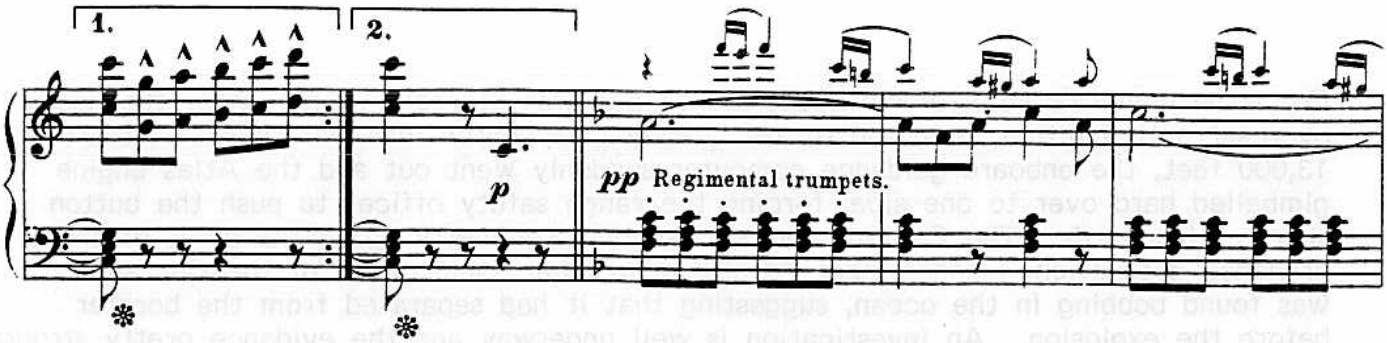
Since then, I've spent the time until now trying to make up for a lost month. The same newspaper carried a front-page story about the AC-67 loss, about which you've heard plenty by this time. My fault: I came back to the plant an hour before the launch and jinxed it (launches have only gone when I've not been around to watch them, otherwise they've been scrubbed). I'm told by the folks who got tickets to watch the show on the projection system that there wasn't much to see anyway.

From the camera's point-of-view, the launch pad was scarcely visible under the heavy overcast until ignition, then the rocket quickly disappeared into the clouds. At around 13,000 feet, the onboard guidance computer suddenly went out and the Atlas engine gimballed hard over to one side, forcing the range safety officer to push the button shortly afterwards. The Centaur was still sending telemetry up to the point of the ordnance detonation, I understand; I'd also heard that some or all of the Centaur was found bobbing in the ocean, suggesting that it had separated from the booster before the explosion. An investigation is well underway and the evidence pretty strongly points to a lightning strike, so NASA is going to take some more lumps for deciding to launch that day, even though their criteria at that time were satisfactorily met. The launch of AC-68 has been postponed from June. More as I overhear it...

Work is really slow for me now. The report on trajectory design for FLTSATCOM that I wrote is being worked over by the fellow I work with on that project and by my boss; it should be published this month. I have essentially no other work left to do on Atlas/Centaur. While NASA and DoD wrangle over what they want in a heavy-lift booster, the folks at the Crystal Palace have cut back on the amount of work they want us doing, since we're spending the company's money (the cosmonauts looked down and laughed...). I don't anticipate that we'll be getting anywhere on that until June, when the formal study (and outside funding) begins. I mostly go in to work and read everything we have on radioisotope thermoelectric generators. The man who is passing this knowledge on to us younger fellas showed me a filing cabinet drawer-and-a-half of material; I may get through it all in time for the NASA seminar...

The meeting I'm going to in a few weeks in Crystal City turns out to be part of the 1987 AIAA Annual Meeting, so I'm going to see if I can get an extra day out there to see some of the rest of the conference and the international aerospace exhibit; that'll depend on whether GD will spring for another night in the hotel. A couple weeks after that, I go to the electric propulsion conference in Colorado Springs; I'll put a copy of our paper in the next **APA-TECH.** I'm vacationing back East around the start of June. The RTG seminar I'm being sent to in Cleveland is the same month. I still haven't decided if I'm going to Westercon over Fourth of July weekend. It's in Oakland and I **am** looking for an excuse to visit the Bay area. The Pronis are coming out, Kip Williams and Cathy Doyle are coming out... I still need to see how many vacation days I can afford. I may be able to pull a paper together for the Case for Mars III conference in July, but I plan to go in any case. I still haven't gotten hotel information for Phoenix, but will reserve rooms as soon as I hear; let me know if you're looking for space.

When I called home the other night, I learned something hair-raising. My father, who started out with **one** Macintosh, is now up to two (one at the office and the other at home), a Thunderscanner, a 20 Mb hard disk, and a laserwriter. He's a commercial artist and wanted some years ago to be able to do his own typography and computer graphics. Now he's experimenting with scanning illustrations into the Mac, doing the layout and typography on the screen, and printing the sample out on the laserwriter; he can show a client several possible variations of an advertisement or brochure in a couple hours' work (the final accepted version would, of course, be done conventionally). He's really enjoying himself and wishes he'd done all this sooner (he **could** have, but the equipment would have cost ten times as much seven years ago). I'm almost ashamed to admit that, as he approaches 62, my father is turning into a computer hacker...



MAILING COMMENTS

APA-TECH 46
(continued)

Actually, the leftover comments I still had for this issue have gotten rather stale. There is one discussion I wanted to get back to, however.

PowerDave (... as opposed to LaserDave or ComputerDave) I, for one, don't believe that solar power satellites are going to be any sort of contributor to our power requirements in the next thirty to fifty years. Moreover, I haven't seen anything yet to convince me that they're such a hot idea.

Let's grant that the following things are true by 2010. Transportation to low Earth orbit is $100 per pound. (It's more like **forty** times that right now; the heavy-lift vehicle program hopes to get it down to $400 a pound by 2000 or so.) With the availability of reusable aerobraking to assist in the return to low Earth orbit (LEO) and the Space Station, the cost of a round trip to geosynchronous orbit (GEO) and back is, say, $300 a pound. Gallium arsenide (GaAs) or indium phosphide (InP) solar cells are a mature technology and convert sunlight to electricity at essentially their theoretical efficiency of 30% (we're starting to get efficiencies of almost 20% now). I will assume there are **no** other inefficiencies in beaming power back to Earth.

The solar constant at one astronomical unit is 1361 W/m^2. That's taken over the whole solar spectrum, which our solar cells can't really use, but it's good for an upper limit. At 30% efficiency, the solar panels out in GEO will produce 408 W/m^2. Let's build a 100 MW solar power station and see what it takes. We'll have 245,000 m^2 of solar cells, which is something like half a kilometer square. The mass density of the panels alone can be taken as about 1 kg/m^2, so they mass about 245 tonnes. (This is an **extremely** optimistic assumption. The specific mass of photovoltaic-cell power systems being considered for the Space Station is on the order of 150 kg/kW and for solar-dynamic systems is about 90 kg/kW). Let's allow that all the other subsystems needed to convert and transmit the power weigh only that much again. We have about 500 tonnes to lift to GEO at, say, $200 a pound, since it's not coming back down again: the launch costs are about $220 million.

The cost of building the station has to be evaluated. It is expected that, in the next several years, the price of fabricating GaAs cells will drop to $1 per cm^2; let's suppose it can be brought down to 30¢ a square centimeter by 2010 (it probably can't go much below that -- we're getting close to the cost of the materials). The solar panels would cost $750 million. Again, let's suppose that the entire station can be brought in at just twice that, or $1.5 billion.

There remains the cost of maintenance. (We'll assume the station is autonomous and costs **nothing** to operate.) Suppose the station has a useful lifetime of 30 years and that maintenance is the equivalent of replacing everything over that interval. We'll propose the use of a manned service vehicle massing 50 tonnes (the Shuttle's mass is about 125 tonnes) plus the spare parts it carries to the station. During the interval from 2010 to 2040, we'll assume that transportation costs decline linearly by a factor of three and material costs for replacements are half the original cost of the station.

If the power station only needs to be man-tended every three months, that will require 120 service visits; we'll assume the service vehicle brings nothing but the crew down to LEO. The 120 round-trips at an average cost of $200 per pound would cost $2.6 billion. The cost of replacements is $750 million and the cost for transporting them, at an average $133 per pound, is about $150 million.

As a former stationkeeper of geostationary satellites, I don't care to contemplate the headaches of controlling the orbit and attitude of this creature (there's going to be a whopping lot of perturbing force from the light pressure acting on a quarter-square-kilometer of solar sail). As a guide, let's take the total propulsion requirements for stationkeeping to be the same as for an existing satellite at GEO, which is 160 feet per second (it **will** be more, but not a great deal more). If we equip the station with an ion engine having a specific impulse of 4000 seconds, the rocket equation says that we'll need 620 kg of propellant annually. (If we use storable chemical fuels, the situation gets pretty bad. With a specific impulse of only 320 seconds, we'd need 7800 kg a year, which starts to become a perceptible transportation expense.) The costs associated with the ion propellant (e.g., argon) are small enough that we'll neglect them entirely.

per year

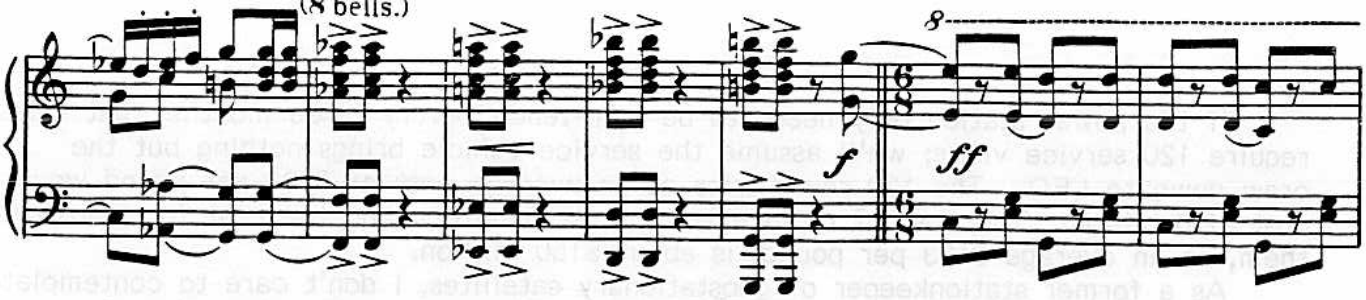
The total price over the thirty years in initial fabrication and launch, servicing visits, and fabrication and transportation of replacement parts is $5.2 billion, which doesn't sound like much over that much time. But it doesn't look good in terms of the energy generated and transmitted. Let's suppose the station maintains its beginning-of-life power output for the full thirty years (**zero** down-time). (This is also a highly optimistic assumption: the conversion efficiency of all known solar cells deteriorates in the space environment.) We'll get 100,000 kW over 30 x 8800 hours for 26 billion kW-hrs; the cost of the electricity is around 20¢ per kW-hr.

In fact, I consider this a **very** generous estimate: my own opinion is that it would cost three to ten times more to build and run this station. The revolution that might save this concept would be to bring everything in from extraterrestrial sources. Transportation to GEO would be rather less; I can't make any good guesses on materials and fabrication.

What effect would these things have on communications, particularly via geo-synchronous satellites? Most existing and projected spacecraft transmit at power levels of tens to hundreds of watts per transponder, so I don't imagine that these multi-megawatt beacons will be much appreciated. On a matter of some personal concern, we can forget about doing optical or radio astronomy from Earth. Claiming that we could just do it all from the Moon is **not** a valid rebuttal unless you plan to move several hundred instruments and thousands of astronomers out there; any idea who will pay for that? In short, I feel that solar power satellites possess all of the defects of Tesla's earlier-proposed "wireless power" stations, with an equal lack of virtues.

I'm afraid I can't agree with your arguments on the need for continuing to expand electrical generating capacity. I don't find it obvious that we have done much to improve the efficiency with which we use power to do work or to curb the American appetite for useless consumption. (Any civilization whose every significant population center can be photographed at night from 600 miles up by the available light of its streetlamps needs to re-evaluate its patterns of electrical usage.) It is my belief that larger amounts of resource consumption is not the only measure of "growth." (If efficiency remains constant, that implies that increasing amounts of garbage and waste heat also signify "growth.") A **mature** technological society should also be able to do more with what it already has. (Adults are not just bigger children, they are also wiser than children.)

Gosh, I really hope you aren't taking this personally! I just get rather disturbed by some of the standard American attitudes about what the future should be and what some consider the "ideal" way to live. (I worry about a society that invents things like electric toothbrushes...)



APA-TECH 47

Cover "It's too bad you didn't show up a few minutes sooner. The Monolith was just here looking for some Bo Diddley..."

555 Bill or Barry (I always get those two confused) suggested we make "I survived the Massacre of '87" T-shirts.

LaserDave You win -- you're writing way more documentation than I ever did. The folks at work enjoyed your "Now Trashing Your Disk" notice. Whether the Amiga's "Guru Meditations" are preferable remains to be seen. Hello, Kate! (Will we be seeing this incredibly cute couple at Westercon?)

Andy Welcome back again and belated congratulations on your engagement! (I believe you and Annette are married as I write this.)

Susannah There's supposed to be a book out on American regional foods; the author travelled all over the U.S. to find them. NPR did a segment about it last year, but I don't remember the author or title. A lot of the "someone else's" food only appeared here in this century and much of it only after World War II. Of course, just about all of the rest came here after around 1650 -- we don't eat many of the aboriginal dishes... Hamburgers, by the way, are European originally, too, when they started out as Salisbury Steak and Steak Tartare and so on. Burgers, hot dogs, pizza, and others, as we know them, were invented elsewhere, but developed here. Some things, like chop suey, were invented here and cannot be found in the countries they're associated with (except through cultural backscatter). I wonder if you can get a California Roll in a sushi bar in Tokyo?

Rolf *"Shirimasen"* means (in this case) "I don't know [as I have not had the opportunity to find out]," to be distinguished from *"Wakarimasen,"* meaning "I don't know [although I should]." (Aren't other people's languages fun??) It seemed an appropriate answer to your original question.

I agree that one should try to use the best available tool for a job. My comment was intended as a reaction to complaints I hear about the software tools on machines like the Macintosh. There are people who seem to expect the computer to do the whole job for them, instead of trying to pick up some basic skills themselves. There are also some who spend an hour at the machine to do something they could have done in ten minutes by hand. My concern is that if people keep pushing more and more work off on the machine, they will make themselves completely unnecessary.

Cap'n Al Welcome back again to you, too! Ah, I love that sound of psychic whiplash!

Regrettably, most of your list of driving rules have become universal. I almost hit someone last month at an all-way-stop intersection who was observing rule (2) about directional signals. (I like to think of myself as a fairly broad-minded fellah, but I really must insist that people indicate when they're about to make a left turn right in front of me.) I've seen an ugly trend emerging back

East. We have few special left-only lanes and signals there, so I've lately noticed this rule: at a traffic signal, the first person making a left turn has the right-of-way. I watched a guy actually start turning his car while stopped to jockey himself into position for blast-off; he got upset with me for asserting my (legal) right-of-way. Southern Californians are working on a new one now. Since this is the birth-place of "right-on-red," they've expanded it to "right-on-red ANYTIME," including into oncoming cross-traffic. We had this logical argument here for some time: life in Southern California **is** life in the fast lane, so get yourself over there (the slow lane is for wimps!); now, if you're driving in the fast lane, you're driving fast by definition. The result is a "population inversion" with a lot of the traffic on the interstates piling up in the left lanes doing 55 or 60; if you want (or need) to pass, you have to do it from the slow lane. Your rule (10) follows as a corollary.

Bombadier Guy Maybe Valli is right -- at least we'd better not send **your** zine out of the country...

Sam I never know what to say when people find themselves in these circumstances. I feel pretty sorry for both of you. I hope you're feeling better now.

Where I work reflects the ugly side of maintaining engineering documentation. We're told to keep **everything** that might be important, so the file room for Flight Mechanics is jammed with stuff for missions going back fifteen years. The papers and computer output from the last three years are in bookcases, in aisleways, on everyone's desks... If we get **really** busy on Titan/Centaur, I don't know where we'll put any of that. But I'm philosophical about these things: it's nothing an accidental conflagration won't cure.

Valli Oh, that red paper vibrates **so** nicely against the green...

Another welcome return! And we even have some derivations for you to enjoy of late -- just wait until you see what we have for you after you take calculus! (Know what a partial differential equation is?)

"The profound impact of American art, cultural, and societal structure/attitudes on the post-WWII Western world..." You might be interested in a book written by a French professor of art while visiting in America. I've presently forgotten his name, but I think the title of the book is **How New York Stole the Idea of Modern Art.** He deals with the premise that, starting in 1948 when the Cold War got under-way, the State Department (with some funding from the CIA!) did a great deal to push American painting and cinema on Western Europe, particularly in places like France. Deals forced upon the French in exchange for our aid included the heavy booking of American films in their theaters; as a consequence, the French cinematic industry was in virtual collapse for a decade. The book is heavily documented and the author makes an interesting, if not totally compelling, case.

Joa Welcome to you as well! I used to listen to shortwave (including half of someone's private ham conversation) on my multi-band Norelco (the first radio/tape recorder of my own) until it broke down and Phillips stopped supplying spare parts to America. If I come to live in a place where I can set up an antenna, I may take it up again.

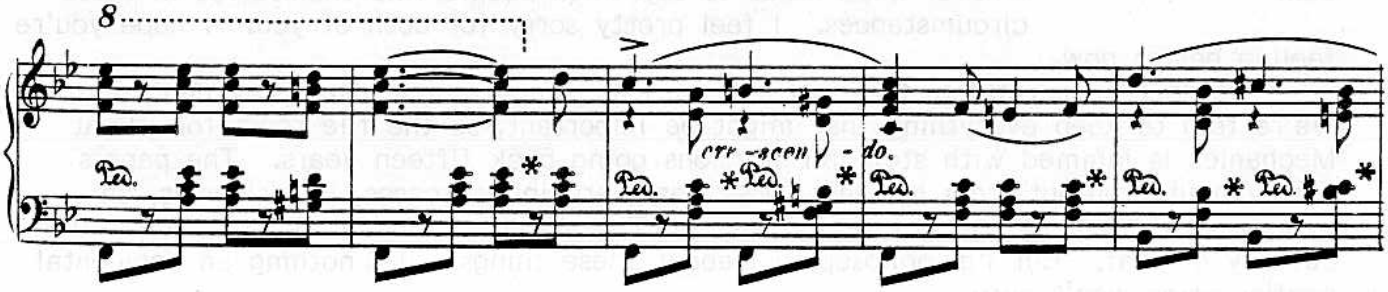
Kiran Nice to hear from you! (Don't mind this gun muzzle set against your temple...)

One of the things that's been bothering me lately about SDI is that, if it does work, it seems to make nuclear war an all-or-nothing proposition. A "limited" was is precluded because an enemy strike of only one to two hundred missiles could be swatted down. Now the Other Guys **must** launch a first strike of one or two **thousand** missiles (quite within their means), which would still be a disaster

for us if SDI is less than 95% effective. (Do **you** believe the claims of 99+% effectiveness made for a three-layered defense?) Alternatively, as Rolf and others suggest, if They think we're protecting ourselves in order to launch a first strike with impunity, They could decide to have it out with us before deployment is well along.

Whether that option would be pursued by the Other Side is unclear. There is a threat, but I don't consider it all that great -- the Soviets are no crazier than we are. (Though, some of the newer members of the Nuclear Club **may** be...) My argument remains that SDI, fully working or not, does nothing to eliminate the nuclear threat and will merely complicate the global arms problem. It's a few hundred billion dollars or more for no increase in human safety.

What I was getting at in saying that the Earth grows enough food for everyone is that the problem of hunger appears not to be agricultural, but political and economic. That is to say, it remains a problem because we choose to make it one. (I suppose one could wonder, on the other hand, if we should try to feed five billion people now, so we can try to figure out how to feed seven billion in twenty years...)



APA-TECH 48

Jamie Good to hear from you again! We don't want you to feel guilty about your free subscription (even though that's such an effective motivator).

I guess we discussed your situation over the phone back in November. The good thing to be said, I suppose, is that the separation is without rancor.

Guest-edited **Pyros** always sound fine to me. Historically, though, they've done little to improve the publication schedule.

You're right: titles **should** be italicized. But, on my machine, that means digging out a daisywheel more often in a font that doesn't match... (I've reserved that inconvenience, so far, only for foreign phrases.)

I will refine my earlier statement to you by saying that San Diego has more than its share of rude and impatient **drivers**. (But you're right: Los Angeles **is** worse. Up there, there's no **point** in signalling, as you will be **ignored!**) I have to admit, though, that Boston is the only place where I've seen an example of **triple-parking**.

The kind of nonsense I was referring to is in this Administration and some of the government agencies. I don't fear the fringe groups in this country all that much (yet).

Snowbound Guy I understand it's becoming popular to do things like videotape an occultation through the telescope with the soundtrack carrying the WWV signals. This is intended to eliminate the observer's reflex lag in marking events. You do this, of course, if you're fussy about getting the time down to the nearest tenth of a second or less.

What do I do to get a copy of your course notes?

Denver Omelettes are also called Western Omelettes, so I'll guess that they call them that in Denver. I think "Coney Islands" were called "Red Hots" at Coney

Island, one of the many terms for the lowly "hot dog" (itself a term coined by some wiseguy journalist back in the 1900s, I believe). I'll bite -- I've never even **heard** of a "Boston Milkshake."

"I wouldn't do the things that those people do..." I enjoyed what I saw of Easton. As for why I wouldn't **live** there, the main reason is that it's too far from New York or Philadelphia.

Barry "Defer - er, defer - er, to the Lord High Executioner!" I just saw a local production of **The Mikado** a couple weeks ago. I'd love to see a kinescope of the 1958 NBC-TV production with Groucho Marx as Ko-ko. (He got interested in Gilbert & Sullivan when he heard an NBC stage crew member singing the Mikado's song, "My Object All Sublime," and asked him what it was.)

John Your title makes it sound like your 'zine should be lavishly illustrated with bright, colorful drawings and printed on thick cardboard pages with their edges singed and the back cover charred. The text would have passages like, "Uncle Bear got down on all four paws in the snow. He took a look under his car. It was like a warm and sunny day down there. The muffler was glowing with a cheery orange light." Thank Heavens you weren't hurt or worse!!

Donna English is the *de facto* official language of the United States by its dominance in the nation and its exclusive use in governmental transactions (at least, I'm **told** that's English they're using). The decision made here attempts to ignore the strong presence of the Spanish-speaking population on both sides of the border. No one is forcing any native English-speaking citizen to learn anyone else's language (though, I can assure you, quite a few of the others know English). Because of the very large Spanish influence hereabouts, you **would** be forced to learn Spanish to be able to function in some areas, although an American could choose to avoid them. (On the whole, Americans seem pretty snobbish when it comes to dealing with other people's languages. A lot of people in the rest of the world learn more than one language as a matter of course.)

Rod It **is** the case that many stars in our local neighborhood are moving relative to the Sun at velocities greater than 100 km/sec: Barnard's Star, BD+36°2147, 61 Cygni, CD-36°15693, Kapetyn's Star (the fastest known at 293 km/sec), CD-37°15492, o^2 Eridani, and AC+79°3888, all within 17 light-years. Nothing has been observed passing through our stellar system at high speed. A body spotted moving into the Solar System at 150 km/sec would **never** be identified as a comet, as it would be on a hyperbolic trajectory about the Sun and thus could not have fallen in from our comet cloud.

It would take a pretty incredible fusion drive to make your spacecraft accelerate at 0.1 g! If it were only the mass of the Shuttle, about 280,000 pounds, your engine would have to supply 28,000 pounds of thrust (that's in the neighborhood of a Centaur upper stage). If we use your specific impulse of 1,000,000 seconds, the exhaust velocity of your particle beam is 1,000,000 x g = 9,810,000 m/sec = 0.033 c, really fast but not relativistic. (A pure photon beam would have a specific impulse of c / g = 299,800,000 m/sec / 32.2 m/sec^2 = 30,570,000 seconds. But then, we really need relativistic mechanics to analyze "photon rockets.") The rate of mass flow of the beam is thrust/specific impulse = 28,000 / 1,000,000 = 0.028 lb/sec = 0.0127 kg/sec. The power requirement is $\frac{1}{2}$ x mass flow rate x (velocity)^2 = $6.1 \cdot 10^{11}$ W = 610 GW! Even if you could build a fusion plant with a specific mass of one gram per kilowatt (at which level, a 2200 MW generating station would weigh about the same as a van), your power source would weigh five times as much as the spaceship (which means you wouldn't get your 0.1-g acceleration: the solution hasn't converged yet).

I believe TAU is supposed to use xenon as a propellant. I'll find out for sure next month: their paper is up right before mine.

Rod, you know Rolf's philosophy concerning the things he owns. He buys screwdrivers that can be used as prybars. (Rolf buys nail-files that can be used as prybars.)

You are correct in saying that gravity is distinguished from acceleration in being radial. But, for the purposes of discussing the principle of equivalence, if you're in a sufficiently small box, say, an ordinary room, the difference is measurable only at fairly high precision.

Rolf I like the title. What sort of bagels do your cats prefer?

There would indeed be differences between the colors as they were printed on the cardboard box and on regular paper, because the materials take up the ink differently. But it is also likely that the jobs were done on completely different presses, possibly not even in the same city. It in unusual, in any case, for the printer to worry about matching the colors very closely, unless the client really insists.

Seven-point type is OK with me, too. My notes to myself here vary between three- and four-point.

One doesn't have to try to diffuse a bomb. It will do that itself quite satisfactorily when the time comes.

Steve Your Czech probably would come back to you (hoo boy, wotta straight line!) if you started hearing it again frequently. I was surprised at how much Spanish I still understood when I moved out here and heard more of it coming out of my radio.

Bob & Connie I feel badly for you over the miscarriage. I hope you have better fortune later this year.

Joa One works in a completely different realm of design when one sets out to childproof anything. It is a world with rules like this: indestructible toys can be used to break other toys. A big part of the challenge is that the demands differ with the age group you wish to protect things against. It is fairly easy to protect anything against kids under four (it can be quite a nuisance, but not intellectually demanding). On the other hand, it gets really tough to thwart a determined ten- to twelve-year-old (that nasty, proto-techie age). Somewhere above that, the requirements become indistinguishable from those for frustrating any sufficiently motivated adult.

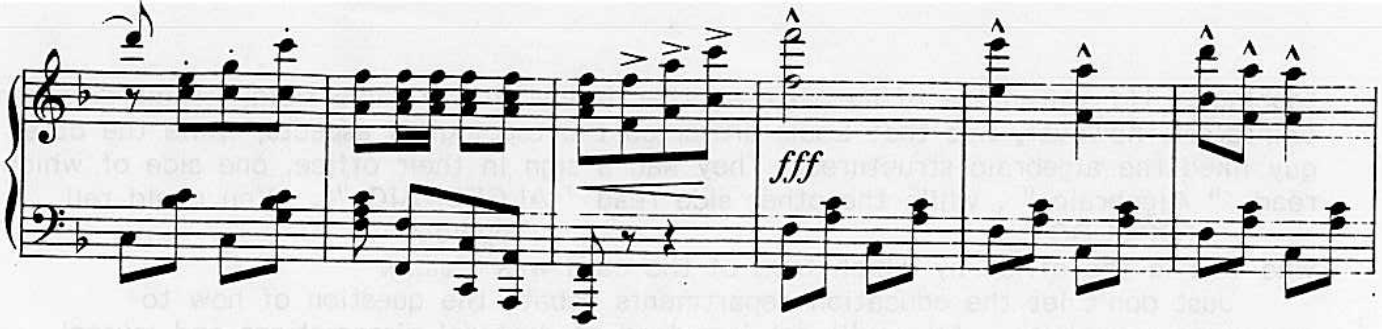
I agree with you about the need to be exposed to as many cultures as possible. You learn, among many other things, that there is no absolutely "best" nation or people.

Valli Ah, the "missing" back cover. (You would notice that...) I had an idea I was developing for a cover commemorating GT's tenth anniversary, when Bonnie's cover came in. I still wanted to use hers, so I thought I'd make it the back cover. Then I reached Higgins and found out our 10th was back in 1985 (and we didn't even celebrate it...). There went my idea and I'd already typed up and printed the table of contents.

Why not (* eek! *) polyculturalism? (Although "polyglot" is a terrible thing to call a child...) [But it has to be better than "linoleum lizard"!]

It makes no difference to me whether franked material is counted as part of someone's 'zine or is compiled separately. (But, fer you, I'll make it separate...) After all, I've seen contributions in the Chicago APAs consisting almost entirely of franked material. I feel that if the person went to the trouble and expense of assembling and copying the stuff, they should be credited. Of course, I wouldn't want them to make a habit of that: I'm in the APA to hear from them, not Mssrs. Larson and Trudeau...

Interesting as the customs folks may find APA-TECH, no one here is doing anything illegal by sending it overseas. All this material is in the "open" literature.



APA-TECH 49

Cover This is a more ornate version of the invertible APA-TECH title and works quite nicely. I'll reprint the earlier one Kip Williams sent in (also under the influence of Scott Kim) in the Cover Index next month.

Linda My Japanese teacher at UCSD Extension was careful to teach us as much as possible about the courtesies and customs. One of my favorite self-effacing phrases comes up when one offers food to a visitor: "This tastes terrible, but please take some."

Has テディー・ラクスピン [Teddy Ruxpin] been joined by a Japanese-speaking グラッビー [Grubby] yet?

Roxanne Actually, males do also experience monthly hormonal cycles, but the physical manifestations, of course, are negligible. There is some evidence that there are psychological effects, but these are very poorly researched.

The 3000 additional cancer deaths due to the Chernobyl accident are the "official" figures for global fatalities. It is difficult to convey bitter sarcasm on a printed page. Suffice it to say that I was appalled that this information was relayed so casually, as if it were all quite routine and unworthy of comment. I wouldn't care to have the job of telling someone that their fatal illness was due to someone's avoidable clumsiness.

Bexley Hall is a (largely unregulated) dorm at M.I.T., where Dr. Consolmagno and I resided between 1970 and 1974 (actually, he transferred in from Boston College in '71). It is a former apartment building erected *circa* 1905; we know this from finding a newspaper page wrapped around a lath exposed when the ceiling over Guy's bathtub fell in. It was the only dormitory that was not a member of the Dorm Council, so its rent and other matters were arranged separately. I think it was also the only place where students could paint their rooms or perform physical alterations as they wished, providing Physical Plant certified that it wouldn't bring the building down. Bexley housed about 130 people, including live-in girlfriends (which was technically illegal; the place wasn't made officially "co-ed" until later in the '70s). In 1973, the cat population peaked at one feline to every four humans. "Ripple," our representative to the General Assembly, was partly responsibly for this, bringing forth over a dozen "Ripplets" in one year. (See what happens when you ask an old man questions about his college days?)

Dave and Susannah A gneiss solution to the acid rain problem!* Actually, I hope this is being researched with some care to understand the mechanisms involved. It is known that acid rain causes a good deal of mineral leaching from soil. While this sounds like a fairly inexpensive treatment, I almost hope Reagan doesn't hear about it: he might decide the whole problem is solved and do nothing else about air pollution (which, as we all know, is caused by trees in the first place...).

* You can always tell a **Science News** subscriber...

Kiran Louis Blair, a fellow ChUSFAn, had an office at U. of Ill. some two minutes from the ChUSFA Library; his specialty is algebriac

topology. He shared the office with another fellow in the same field. Their divergence of interest, however, was that Louis preferred the topological aspects, while the other guy liked the algebraic structures. They had a sign in their office, one side of which read " Algebraic " , while the other side read " ALGEBRAIC " . You could tell
TOPOLOGY Topology
who was in the office by which face of the card was visible.

Just don't let the education departments debate the question of how to encourage creativity. All you'll get is a load of doctoral dissertations and journal articles, with no change in teacher training or the success ratio in schools.

The one point I disagree with you on concerning defensive driving is whether other drivers are "out to get you." I feel that usually presumes an attention to their surroundings that is infrequently demonstrated. A stochastic model is perhaps more accurate for freeway driving: regard the traffic as an ideal gas of automobiles...

The issue of the long-term stability of the Soviet Union seems to be a real analytical headache. Many feel that the diverse ethnic regions could try to split off immediately if there were a national economic collapse or other reason why Moscow might lose control. The reaction of the Soviet military forces both within and without Russia and of the Warsaw Pact nations appears difficult to predict. I've seen suggestions ranging from dismantlement and neutralization of the U.S.S.R. to widespread Eurasian war to global holocaust. How SDI affects any of this is just one further complexity.

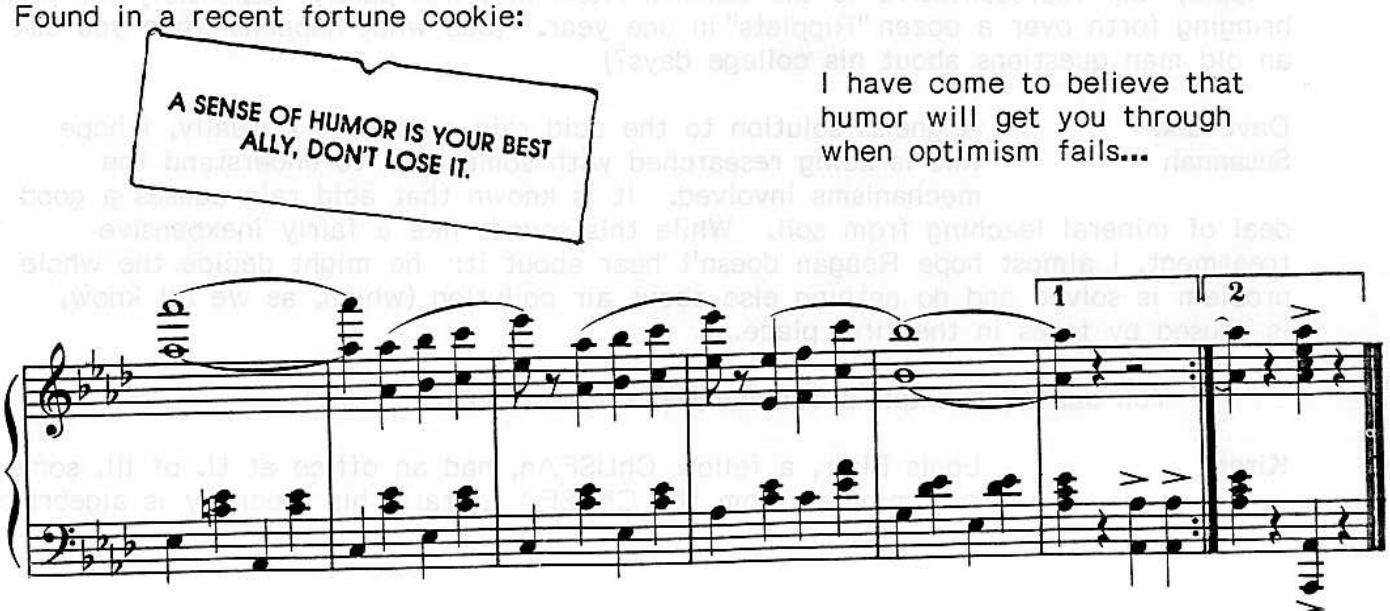
Being from the Northeast and having lived there most of my life, I can't say I understand your statement about the residents' reaction to snow. There is substantial investment in snow removal equipment. In the town my folks live in, I can remember getting only one snow day off from high school in six years. (A foot of snow made little difference: if our Superintendent of Schools could get to **his** office, **everybody** went to school. We kids **hated** the man...) If you want to see some **real** wimps, come down here -- **they** think it's cold when it gets down to 55.

* * *

Coda. I'll pick up the mailing comments from here in a couple weeks. Things have gone from slow to crazy at work now. Suddenly, after wasting three months organizing who gets to be in charge of what on the Heavy-life Launch Vehicle program, they now want the two of us who are available in Flight Mechanics to answer all their questions at once. I have learned so much here about why the space program is so loused up. (It's high time they let some new people mess it up for a while!) Somehow, I'm convinced, we'll get some new rockets and a space station up there by 2000, **anyway**. Enough for now. Maestro, final cadence, please!

* * *

Found in a recent fortune cookie:



I have come to believe that humor will get you through when optimism fails...